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THE CHEMIST SERVES GROWERS OF COTTON AND USERS OF COTTON PRODUCTS; COTTON FIBER AND COTTONSEED.

A radio talk by Dr. Henry G. Knight, Chief, Bureau of Chemistry and Soils, delivered in the Department of Agriculture period, National Farm and Home Hour, Friday, September 23, 1932, by a network of 47 associate NBC radio stations.

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SALISBURY:

Once again it is my pleasure to present to you Dr. Henry G. Knight, chief of the Bureau of Chemistry and Soils. Dr. Knight continues today his series of reports on results of recent chemical research of service to the growers and users of major farm products of the United States. His two previous talks have dealt with chemical research of service to the apple and citrus industries. By the way, a number of you Farm and Home Hour folks who have written to Dr. Knight for further information on points covered in his talks apparently have been confused by my poor pronunciation of his name and you address him as Dr. Nye, or Dr. Nike, and so on. Let me say that his name is spelled, K-N-I-G-H-T. Yes sir. Sir Knight, if that helps you to remember it.

Today, Dr. Knight tells us the story of research findings of use to people who grow the great staple crop of the South -- cotton -- the industries that process cotton and cottonseed, and the consumers who use cotton products. Cotton is important to this country. We grow more than half of the world's crop. Production of this fiber is the mainstay of agriculture in the South. Most of us realize vaguely that chemists have played a major part in the expansion of the cotton industry from a production of less than 10,000 bales at the time of the first census back in 1790 to the present average annual production of more than 13 million bales. Chemists have helped growers adapt fertilizers and insect poisons to the requirements of cotton production. Chemical research laid the basis for the huge cottonseed oil industry, now turning out products each year valued at from 100 to 300 million dollars. And chemists are working away at still other problems of cotton growers, processers, and users. Dr. Knight is going to tell us the story of recent results of chemical research on those problems. Ladies and gentlemen, Dr. Henry G. Knight.

KNIGHT:

Well, here I am again, friends. During the past week I took a trip through the northern edge of the cotton belt. And while the scenes are fresh in mind I'm delighted to give you a brief but more or less comprehensive report on our chemical research work on cotton at present and in the recent past. I'll divide the story into two parts. One part will be a report on research on the cotton fiber; the other part will be a report of research on cottonseed.

Our manufacturers weave the cotton fiber into all sorts of fabrics from the sheerest of dress goods to the heaviest of tarpaulins. Of course, chemists have helped to develop the processes for making and dyeing the finer fabrics, but today I'm going to talk with you about the work of our chemists on the heavier cotton fabrics for out-door use. Each year, the people of the United States spend some 70 million dollars for such fabrics. We use them in tents, awnings, sails, tarpaulins, wagon and truck covers, hay caps, and tobacco shade cloth. But we would double our use of cotton fabrics out-doors if chemistry

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could give us better methods of treating them so that they would resist water, would not take fire so easily; and would last longer. We also need treatments, preferably sprays, that will prevent weather damage to cotton in the bale. Damage of this type costs fully 25 million dollars a year.

So our chemists have been looking for better methods of water-proofing, weather proofing, fire-proofing and mildew-proofing cotton and cotton fabrics. We are studying the fire-proofing and flame-proofing effects of various treatments and materials as influenced by exposure to the weather. One main aim of the research is to develop a practical weather-resistant fire-proofing treatment for awnings and for other fabrics used outdoors. Since sunlight promotes deterioration of cotton we are trying to develop an inexpensive and easily applied light-proofing treatment for cotton goods for out-door use such as tobacco shade cloth. Other research workers are experimenting with preservative treatments for fertilizer bags and treatments that will protect raw cotton against mildew and rot, without changing its appearance, increasing its weight appreciably, or interfering with manufacturing processes. Success in this research work will be of benefit to users of these cotton fabrics, and also will widen the market for cotton to the benefit of the producers.

The research on water-proofing canvas already has brought significant results. Before we started this research most manufacturers used parrafin alone or in combination with other substances. But our research has shown that treatments with parrafin or other greasy or oily substances that do not distinctly color the fabric make canvas deteriorate rapidly when it is exposed to sunlight. So now manufacturers use pigmented treatments. Our experiments have further demonstrated the value of using bituminous materials to water-proof canvas. And they have proved that treatments with parrafin and parrafin mixtures make cotton fabrics more susceptible to mildew.

So much for the progress of chemical research on making cotton itself resist mildew and rot, and on making cotton fabrics wear longer, and resist water, fire, light, and acids.

Now, I can give you only a brief account of chemical research on the cottonseed. By the way, the story of the rise of the cottonseed industry is one of the fascinating romances in the history of industrial chemistry. Chemists helped develop the process for extracting the valuable oil from the seed. Then they created a process of refining the oil to make it suitable for edible purposes. Following that they originated the process of "hydrogenation," by which a liquid oil can be converted into a solid fat. This discovery made possible the great variety of vegetable shortenings you women now use in baking.

While one group of chemists developed the hydrogenation process, another found scores of uses for the fine fuzz, known as linters, that covers upland cottonseed after it comes from the gins. Today cotton linters appear in all sorts of forms. It appears on your back as rayon garments; in your medicine chest as absorbent cotton; on your furniture or floors as waterproof varnish; in your cameras as photographic films; and even on "skinless frankfurters" as the invisible casings.

But I mustn't go too far into this fascinating story of the chemical development of the cottonseed industry. More than 30 commerical products are

now obtained from cottonseed, once a farm waste. I want to tell you about some of the recent accomplishments of our chemists that have served both growers and users of cottonseed.

One problem of great importance to cotton farmers and to cottonseed oil millers has been the problem of setting up a reliable method for grading cottonseed. The industry requested the Bureau of Chemistry and Soils to solve the problem. Our chemists found methods of determining the value of different lots of cottonseed, and the industry adopted grades based on these methods. The grading began two years ago. By last year the whole industry had accepted these grades, and they were made official by order of the Secretary of Agriculture in May of this year. I think you can see the result of this work. The grading method discriminates between seed of good quality and seed of poor quality. Thus it raises the standard of cottonseed and will materially increase its value.

Another of our recent investigations revealed the fact that the sediment from oil pressed from cottonseed or, as the trade calls this sediment, "foots," has a bad effect on crude cottonseed oil during storage. The "foots" when left in contact with the oil during storage, causes the oil to deteriorate quickly. As a result of this discovery of ours manufacturers now carefully separate the "foots" from the oil before storage, and so prevent large losses.

But the "foots" is not a total loss. The chemists have gone to work on it and now manufacturers are putting on the market inedible oils used in soaps and washing powders, and a substance used in making roofing tar, linoleum and artificial leather -- all made from "foots."

We are now investigating the time and temperature of cooking the raw cottonseed before pressing the oil from it. We want to find the time and temperature of cooking that will give the maximum yield of oil, and a press cake meal of highest nutritive value. The preliminary results already are finding application in the industry.

Mention of the press cake meal reminds me of our experiments which recently revealed the fact that a greater proportion of cottonseed meal can be used economically in the ration for cattle and hogs when the meal is combined with certain other plant or animal products. But I shall not go further into this separate field of research on the feeding value of cottonseed meal and the best methods of feeding meal. The results of these researches are now coming to you feeders through the men of the State experiment stations and the State extension services.

Consult these State agricultural men for further information about these results. Finally, I invite any of you directly interested in getting more facts about the industrial application of chemical research on cotton and cottonseed to write us.

Good-by until next Friday.